

IN THE CLAIMS:

Claims 1 – 22 stand cancelled.

23. (PREVIOUSLY PRESENTED) A recombinant pox virus comprising a nucleic acid sequence encoding an immunogenic MUC1 fragment comprising approximately 5 to 25 MUC1 tandem repeat units, wherein said nucleic acid sequence is altered from the native tandem repeat pattern by using alternative codons to reduce homology between the repeats.
24. (CURRENTLY AMENDED) The recombinant pox virus of claim 1 23, wherein the immunogenic MUC1 fragment comprises approximately 7 to 15 MUC1 tandem repeat units.
25. (CURRENTLY AMENDED) The recombinant pox virus of claim 2 24, wherein the immunogenic MUC1 fragment comprises 10 MUC1 tandem repeat units.
26. (CURRENTLY AMENDED) The recombinant pox virus of claim 1 23, wherein the pox virus is selected from the group consisting of orthopox, suipox and avipox.
27. (PREVIOUSLY PRESENTED) A pharmaceutical composition comprising a recombinant pox virus comprising a nucleic acid sequence encoding an immunogenic MUC1 fragment comprising approximately 5 to 25 MUC1 tandem repeat units, wherein said nucleic acid sequence is altered from the native tandem repeat pattern by using alternative codons to reduce homology between the repeats, and an immunomodulator.
28. (CURRENTLY AMENDED) The pharmaceutical composition of claim 5 27, wherein the immunomodulator is selected from the group consisting of T-cell co-stimulatory factors and cytokines.
29. (CURRENTLY AMENDED) The pharmaceutical composition of claim 6 28, wherein the cytokine is an interleukin.
30. (CURRENTLY AMENDED) The pharmaceutical composition of claim 5 27, wherein the immunomodulator is both a T-cell co-stimulatory factor and a cytokine.

31. (CURRENTLY AMENDED) The recombinant pox virus of claim ~~5~~27, wherein the pox virus is selected from the group consisting of orthopox, suipox and avipox.
32. (CURRENTLY AMENDED) The pharmaceutical composition of claim ~~5~~27, wherein the immunomodulator is encoded by a nucleic acid sequence on a separate pox virus from said recombinant pox virus comprising the nucleic acid sequence encoding said immunogenic MUC1 fragment.
33. (CURRENTLY AMENDED) The pharmaceutical composition of claim ~~5~~27, wherein the immunomodulator and the immunogenic MUC fragment are both encoded by nucleic acid sequences located on a single pox virus.
34. (CURRENTLY AMENDED) The pharmaceutical composition of claim ~~5~~27, wherein said MUC1 fragment comprises about 7 to 15 tandem repeat units.
35. (CURRENTLY AMENDED) A method of generating an immune response in a mammal having a MUC1-expressing tumor comprising:
 - (a) administering to the mammal the pox virus of claim ~~1~~23; and
 - (b) administering a second amount of pox virus wherein the pox virus is selected from the group consisting of orthopox, suipox and avipox.
36. (CURRENTLY AMENDED) The method of claim ~~13~~35, wherein said boosting is administered by using an effective amount of second recombinant pox virus from a different viral genus from said pox virus of claim 1.
37. (CURRENTLY AMENDED) The method of claim ~~13~~35, wherein said mammal is further administered an immunomodulator.
38. (CURRENTLY AMENDED) The recombinant pox virus of claim ~~1~~23 which is rV-MUC1.
39. (CURRENTLY AMENDED) The method of claim ~~13~~35, wherein the boosting comprises an effective amount of MUC1 administered as a MUC1 peptide or as a nucleic acid sequence that encodes said MUC peptide.

40. (CANCELLED)
41. (CURRENTLY AMENDED) A method for generating an immune response in a mammal that contains a MUC1-expressing tumor comprising administering to said mammal at least one pox virus of claim ~~4~~26.
42. (NEW) The recombinant pox virus of claim ~~1~~23, wherein the pox virus is MVA.
43. (NEW) A method for treating a host having tumor cells expressing MUC-1 comprising the steps of:
- i) administering to a host a first recombinant pox virus vector system that encodes a nucleic acid sequence encoding an immunogenic MUC1 fragment comprising 5 to 25 MUC1 tandem repeat units, wherein said nucleic acid sequence is altered from the native tandem repeat pattern by using alternative codons to reduce homology between the repeats; and
 - ii) administering, thereafter, at least a second recombinant pox virus vector, wherein the pox virus vector is from a different pox virus genus than the first pox virus vector, wherein the second recombinant pox virus vector encodes a nucleic acid sequence encoding an immunogenic MUC1 fragment comprising 5 to 25 MUC1 tandem repeat units, wherein said nucleic acid sequence is altered from the native tandem repeat pattern by using alternative codons to reduce homology between the repeats, thereby boosting said host.
44. (NEW) The method of claim 43, further comprising administering an immunomodulator.
45. (NEW) The method of claim 44, wherein the immunomodulator is a cytokine or a co-stimulatory molecule.
46. (NEW) The method of claim 45, wherein said co-stimulatory molecule B7.
47. (NEW) The method of claim 46, wherein said B7 is B7.1 or B7.2.
48. (NEW) The method of claim 45, wherein the cytokine is an interleukin.
49. (NEW) The method of claim 43, wherein said first recombinant pox virus vector is a pox virus vector selected from the group consisting of an orthopox virus vector, an avipox virus vector, a suipox virus vector, and a capripox virus vector.
50. (NEW) The method of claim 49, wherein the first recombinant pox virus vector is an orthopox virus vector.

51. (NEW) The method of claim 50, wherein the orthopox virus vector is a vaccinia virus vector.
52. (NEW) The method of claim 50, wherein the vaccinia virus is an MVA.
53. (NEW) The method of claim 50, wherein said second recombinant pox virus vector is selected from the group consisting of an avipox virus vector, a suipox virus vector, and a capripox virus vector.
54. (NEW) The method of claim 43, wherein the first recombinant pox vector is an orthopox virus vector and the second recombinant pox vector is an avipox virus vector.
55. (NEW) The method of claim 54, wherein the avipox virus vector is a fowlpox virus vector.
56. (NEW) The method of claim 54, wherein the orthopox virus is a vaccinia virus.
57. (NEW) The method of claim 56, wherein the vaccinia virus is MVA.
58. (NEW) The method of claim 43, wherein said first recombinant pox virus vector further comprises a nucleic acid sequences encoding an immunomodulator.
59. (NEW) The method of claim 43 or 58, wherein the second recombinant pox virus vector further comprises a nucleic acid sequences encoding an immunomodulator.